REMARKS

Claims 1-31 are pending in the application. Claims 1-5, 11-13, 17-20 and 28-30 are rejected. Claims 6-10, 14-16, 21-27 and 31 would be allowable if rewritten into independent form.

Claims 1 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent application publication no. 2002/0103609 (referred to as "Kuyel").

Applicants amend features of claim 1 to conform more closely to features of claim 17. The Office Action indicates Kuyel expressly teaches most features of claim 1 as shown in the following table. Features that the Office Action indicates are not expressly taught in Kuyel are shown with struckthrough text. Letters are added to provide a convenient reference for the following discussion.

Feature of Claim 1	Citation to Kuyel
(a) obtaining sampling points close to corresponding zero-crossing points of the signal under measurement as approximated zero-crossing points	from previous OA: para. [0028] lns. 1-5; para. [0041] lns. 7-9; Fig. 5A elements 406,410
(b) obtaining ~~phase~~ errors between the approximated zero-crossing points and the corresponding zero-crossing points of the signal under measurement as a zero crossing ~~phase~~ error data sequence	Fig. 5A variance measure set 508; and paragraph [0043]
(c) ~~obtaining time intervals between adjacent approximated zero-crossing points as a zero-crossing time interval sequence~~	none
(d) obtaining a ~~period~~ jitter sequence of the signal under measurement from the zero-crossing ~~phase~~ error data sequence~~, the zero-crossing time interval sequence and a fundamental period of the signal under measurement~~	equ. (6) and (7) to calculate overall jitter

With respect to the missing features, the Office Action states the following:

> ... the error between the approximated zero-crossing points and the corresponding zero-crossing points of the signal under measurement can be either expressed as time or phase errors and conversion from/to time and phase units in sine waves is equally obvious to a person of ordinary skill in the art ..., resulting into a zero-crossing phase error data sequence.
>
> Kuyel computes overall jitter and can easily compute period jitter – defined as the difference between the ideal period and the measured period of the signal, and T_{error} is time difference (error) caused by jitter and can be computed by equation (7) of Kuyel.

Applicants respectfully traverse the rejection of claim 1 for each of several reasons.

Feature (a)

With regard to feature (a), the Office Action does not indicate how and where it is believed Kuyel teaches this feature but Applicants note a previous office action indicated this feature is disclosed in paragraphs [0028] and [0041] and in figure 5A as shown above. Applicants disagree.

Kuyel discloses a system for measuring the jitter of analog-to-digital converters (ADC). The basic method generates a signal, uses an ADC to obtain a first set of measurements representing overall jitter including system noise, generates a second set of measurements representing only system noise, and determines overall jitter alone by using variances in the first and second sets of measurements (see paragraph [0010]).

The previous office action refers to text and figures in Kuyel to supports its contention that the obtaining of approximated zero-crossing points is disclosed. Specifically, it refers to paragraphs [0028] and [0041] and Fig. 5A. Paragraph [0041] appears to be irrelevant. Paragraph [0028] and Fig. 5A both describe the well known effects of jitter, which is that the sampling of a signal intended to occur at a zero-crossing point may instead occur at a point near the actual zero crossing. In other words, Kuyel merely illustrates the effects of jitter. Applicants believe it is indisputable that sampling points 502 and 503 shown in Fig. 5A, whether at or near the actual zero-crossing point, correspond to conventional sampling points that are referred to in claim 1 as the "corresponding zero-crossing points." There is no teaching in Kuyel that explains how to obtain additional approximated zero-crossing points for the same signal.

If it is still believed that Kuyel discloses or suggests feature (a), Applicants request that the next communication clearly explain what is regarded to be the approximated zero-crossing points, what is regarded to be the corresponding zero-crossing points as claimed, and what in Kuyel teaches how to obtain these approximated zero-crossing points.

Feature (b)

With regard to feature (b), the Office Action indicates Kuyel does not expressly teach obtaining phase errors or a phase error data sequence but alleges (1) Kuyel does disclose obtaining time-based errors and error data sequence that can be expressed as phase errors and (2) conversion between time and phase units in sine waves is equally obvious to a person of ordinary skill. The Office Action refers to paragraph [0043]and figure 5A as support for the alleged disclosure.

Applicants respectfully traverse for several reasons.

First, because Kuyel does not disclose or suggest the claimed approximated zero-crossing points as explained above, it cannot disclose or suggest obtaining phase errors based on these points as claimed.

Second, the text in paragraph [0043] and the illustration in figure 5A teach nothing more than the conventional effects of timing jitter on signal sampling. There is no suggestion to obtain an error data sequence of any type.

Third, the argument given in the Office Action is not sufficient to make out a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three criteria must be met:

(1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
(2) there must be a reasonable expectation of success; and
(3) the prior art reference must teach or suggest all the claim limitations.

The teaching or suggestion to make the modification and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. MPEP § 2142.

In this instance, the Office Action alleges nothing more than a person of ordinary skill was capable of converting between time-based errors and phase errors for sine waves. It does not set forth any motivation or indicate any teaching to make this conversion in the system disclosed in Kuyel. It also does not set forth any reasonable expectation of success for anything.

Feature (c)

The Office Action does not provide any clear assertion or support for an assertion that it would have been obvious to obtain the claimed "zero-crossing time interval sequence between the approximated zero-crossing points."

Applicants note that the Office Action does refer to the text in paragraph [0043] and the illustration in figure 5A for support with regard to the phase error data sequence discussed above; however, this paragraph does not disclose or suggest obtaining an error data sequence of any type.

If it is still believed that Kuyel discloses or renders obvious feature (c), Applicants request that the next communication clearly explain what is regarded to be the claimed time interval sequence and what is taught regarding how to obtain it.

Feature (d)

With regard to feature (d), the Office Action indicates "Kuyel computes overall jitter and can easily compute period jitter."

Applicants respectfully traverse for several reasons.

First, the Office Action has not made a sufficient showing to establish *prima facie* obviousness as explained above. Even if something could have been done easily, this is not a sufficient showing.

Second, Kuyel does not disclose or suggest obtaining the claimed period jitter sequence. As claimed, this sequence is obtained from: (1) the zero-crossing phase error data sequence, (2) the zero-crossing time interval sequence, and (3) the period of the signal under measurement. Kuyel does not disclose or suggest this.

The Office Action refers to equations (6) and (7) in Kuyel as being pertinent; however, Kuyel indicates these equations obtain what is called "overall jitter." Kuyel clearly explains that "overall jitter" of a disclosed system includes internal jitter of a data converter, a signal generator and a clock source. "Overall jitter" does not represent period jitter of a signal under measurement.

Third, the techniques disclosed in Kuyel are incapable of computing period jitter. Kuyel discloses a method for calculating the variance of timing jitter by computing variances of a first measurement set having the maximum slew rate of the signal and a second measurement set having the minimum slew rate of the signal (see Fig. 3). Information about the instantaneous values of timing jitter is not retained by the computed variances; thus period jitter cannot be obtained using this technique.

Fourth, the claimed invention does not use anything that corresponds to the second measurement set disclosed in Kuyel. Even if all other differences discussed above are ignored, this difference alone provides evidence that the claimed invention is not rendered obvious by the teachings in Kuyel.

If it is still believed that Kuyel discloses or suggests feature (d), Applicants request that the next communication clearly explain what is regarded as being the claimed period jitter sequence and what three (or more) elements are used to obtain it.

Similar arguments apply to claim 17. All other claims are dependent on either claim 1 or claim 17 and add further limitations thereto.

The Office Action refers to U.S. patent 3,995,222 (referred to as "Mitarai") as being pertinent. Applicants respectfully disagree. Mitarai discloses a sinusoidal waveform generator that oversamples a reference clock and uses filters to eliminate harmonics. Its teachings have no particular relevance to what is disclosed in Kuyel or to what is claimed.

CONCLUSION

Applicants request reconsideration in view of the discussion set forth above.

Respectfully submitted,

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I certify that this Response to Office Action and any enclosed materials are being deposited with the United States Postal Service on September 5, 2006 with sufficient postage as first class mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

David N. Lathrop